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THE PROGRESS OF SCIENCE

CURRENT COMMENT

BY DR. EDWIN E. SLOSSON

Science Service

THE SCIENCE OF KEEPING COOL

THE problem of hot weather is not, as some folks seem to think, how to keep the heat out. It is how to get the heat out. The body temperature sticks pretty close to the normal point of 98.6 degrees Fahrenheit and unless the air temperature gets above that we do not take on heat from the air.

For heat, like water, runs down hill. It passes from a higher to a lower temperature. The steeper the grade the faster the flow. That's where the difficulty comes in. For we have to keep our internal temperature at the normal point, whatever it may be outside, and there is only a thin skin and some clothes between. When the weather is cold we have no trouble in getting rid of the heat we produce from the food we eat, for it runs off rapidly, so rapidly that we have to put on more clothes to check it. But as the air temperature rises nearer to that of our own the current of escaping heat slows up and finally sets back if the temperature goes over 99.

We shut down the furnace in our houses when winter goes. But we can not shut down the furnace inside of us because the works would stop. Our internal furnace serves as a power-house as well as a heater. We have to keep the engine going night and day and that requires a certain amount of fuel, though of course we do not need so much in summer time.

A man who is not doing much, "just up and about," will have to have 2,400 calories of food a day. If he is working, he will need 500 or

1,000 more. So even if he lives in idleness he has to get rid of heat at the rate of 100 calories an hour on the average, which is about as much heat as is given off by four ordinary electric lights.

Now this heat can be got rid of in two ways. It can run away or be carried away. It will run away if the temperature of the surrounding air is enough lower than the body and there is enough, not too much, cloth between.

It can be carried away by water. Water can carry more heat without showing it than anything else in the world. A quart of water will take on a calorie of heat and only show a rise of less than two degrees Fahrenheit. When a quart of water evaporates it carries off about 500 calories. If, then, you sweat a quart this is the quantity of heat you are getting rid of, provided the perspiration evaporates from the skin. Here is the difficulty. If the air holds already all the water it can take up, then you can not get the benefit of the absorption of heat through evaporation. So when the air is saturated with moisture, or, as the weather man puts it, when the humidity is 100, then you say "this is muggy weather" and you complain that the heat is intolerable even though the thermometer does not stand high.

Your own internal thermometer, your sense of temperature, only registers loss and gain. You feel warm when you are gaining heat. You feel cool when you are losing heat. You can only lose heat by radiation when the air is cooler than your skin. You can only lose heat by evaporation when the air is drier than your skin. It is only the layer next



ALFRED GOLDSBOROUGH MAYOR

In whose death biological science suffers a severe loss. Dr. Mayor was director of the department of marine biology of the Carnegie Institution of Washington

to your skin that counts. If the air there has a temperature of 99 degrees and a humidity of 100 per cent., then you can not get cool either way. In that case you must drive away the layer of hot moist air and let some that is drier and cooler get at your skin, which you can do by means of a breeze, or, in default of that, a fan.

GASOLINE AND ALCOHOL

BEFORE prohibition the per capita consumption of gasoline and alcoholic beverages was about the same, twenty gallons a year. Now the consumption of alcoholic beverages is

theoretically reduced to zero while the consumption of gasoline has risen to seventy-seven gallons per capita.

But we may live to see these ratios reversed and gasoline decline while alcohol rises until vastly more alcohol is manufactured. For if alcohol comes into general use for fuel purposes vastly more must be manufactured than in the days when it was thought fit to drink. Now that the law will not allow us to drink liquor, we have alcohol to burn. And so soon as men get accustomed to regard alcohol as fuel instead of as food, the vexatious restrictions that